Course Information Form (CIF)

Course Code: ELX 116

Course Title: HVACR Principles and Practices

Department: Applied Sciences and Technologies
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 46.0302
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 1-2-2
Credit Hour Distribution:

Lecture: 1	Lab: 2	Clinical: 0	**Total: 2**

General Course Information

Catalog Description

Heating and air conditioning systems, their operation, and their installation and maintenance; schematic reading, troubleshooting, and newer technologies gaining popularity in older buildings, homes, and new installations.

General Course Objectives

The student should be able to describe the order of operations of most modern heating and air conditioning systems typically found in residential and light commercial applications. They should also be able to articulate the relationship of heat with current, and voltage in resistive thermal devices and thermocouples, and their role in temperature control circuit operation. Students should also be able to explain how the troubleshooting process is performed on HVAC systems, demonstrate how to interpret HVAC schematic diagrams and their symbology, and use these to physically wire an HVAC system.

Minimum Placement Levels

English	Reading	Math
None	None	Placement out of MAT 060

Prerequisites

Credit in ELX 115

Methods of Evaluation

Students will be given a minimum of 2 quizzes, 2 labs, 1 final exam, and 1 lab practical exam.

Instructional Materials and Additional Supplies

Illustrated Guide to the National Electrical Code, 8th Edition. Charles R. Miller. Cengage Publishing. 978-0357371527
National Electrical Code 2020, 978-1455922970
Safety glasses

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Electric Heating and Furnaces	1. Describe and contrast radiant, forced-air, and other types of heating systems, and indicate recommendations and potential benefits of each. 2. Identify and describe major components of heating systems and thermal sink systems and explain how regional average temperatures (degree day estimations) factor into the selection of insulation, ventilation, and temperature maintenance. 3. Demonstrate the ability to install, terminate, and troubleshoot furnaces, electric heaters, and their control circuits.	4	8	0
Air Conditioning Systems	1. Describe the common types of air conditioning systems and indicate recommendations and potential benefits of each depending on application. 2. Identify and describe major components of air conditioning systems and explain how average peak temperatures factor into the selection of insulation, ventilation, and temperature maintenance. 3. Demonstrate the ability to install, terminate, and troubleshoot air conditioning systems and their control circuits.	4	8	0
Schematic Reading	1. Identify and define electrical symbols commonly seen in schematic diagrams. 2. Describe how to identify and read various types of blueprints, logic diagrams, and schematics. 3. Demonstrate the ability to utilize electrical schematics, measuring devices, and machine logic in order to troubleshoot a typical HVACR circuit.	4	8	0
Heat Pumps, Geothermal, and Solar HVACR Systems	1. Identify and define alternative HVACR systems and their operation. 2. Describe how alternative systems differ from conventional systems in context with short and long-term cost considerations. 3. Demonstrate the ability to utilize electrical schematics, measuring devices, and machine logic in order to troubleshoot alternative HVACR systems.	3	6	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
15	30	0